PENERAPAN PEMIKIRAN KRITIS DALAM PENGAJARAN DAN PEMBELAJARAN PENSYARAH INSTITUT PENDIDIKAN GURU (IPG)

FADZLI BIN DAHALAN

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Graduate School
of Arts And Sciences

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Kebenaran Mengguna

Penyerahan tesis ini ialah sebagai keperluan untuk pengijazahan Doktor Falsafah daripada Universiti Utara Malaysia. Saya bersetuju menjadikan tesis ini sebagai bahan rujukan di perpustakaan. Saya juga bersetuju bahawa kebenaran untuk membuat salinan keseluruhan atau sebahagian daripadanya bagi tujuan akademik mestilah mendapat kebenaran daripada Dekan Awang Had Salleh Graduate School of Arts and Sciences. Sebarang bentuk penyalinan, penerbitan atau penggunaan secara keseluruhan atau sebahagian daripada tesis ini bagi tujuan komersial adalah tidak dibenarkan tanpa kebenaran bertulis daripada penyelidik. Pernyataan rujukan kepada penyelidik dan Universiti Utara Malaysia mestilah dinyatakan dalam bentuk rujukan yang terdapat dalam tesis ini.

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Dekan Awang Had Salleh Graduate School of Arts and Sciences
UUM College of Arts and Sciences
Universiti Utara Malaysia
06010 UUM Sintok.

Abstrak

Pemikiran kritis adalah suatu proses intelektual yang berlaku secara berdisiplin dan aktif yang memerlukan kemahiran dalam mengkonsepsi, mengaplikasi, menganalisis dan mensintesis. Matlamat utama pemikiran kritis ditekankan pada pelbagai peringkat institusi pendidikan adalah untuk melahirkan pelajar yang kompeten dengan cabaran alam pekerjaan pada masa hadapan. Sungguhpun peranannya diperakui dalam hampir semua disiplin ilmu, namun kepentingannya seolah-olah tidak diberi perhatian secara serius dalam pendidikan guru. Mutakhir ini, program pendidikan guru seringkali menerima kritikan secara meluas kerana dianggap tidak praktikal serta menjadi penyebab utama berlakunya amalan pengajaran yang tidak efektif dalam melahirkan generasi pelajar yang berpemikiran kritis. Kajian kualitatif ini dilaksanakan bertujuan meneroka bagaimana pemikiran kritis diterapkan oleh pensyarah dalam amalan pengajaran mereka di salah sebuah Institut Pendidikan Guru (IPG) di Utara Semenanjung Malaysia. Seramai enam orang pensyarah yang mengajar kursus Sains dan Matematik telah dipilih sebagai peserta kajian ini. Data-data kajian ini diperoleh menerusi temu bual, pemerhatian aktiviti pengajaran serta dokumen-dokumen yang relevan. Data diperolehi kemudiannya dianalisis menggunakan perisian ATLAS-ti Versi 7.0. Dapatan kajian menunjukkan majoriti peserta memperlihatkan kecenderungan yang positif untuk menerapkan pemikiran kritis dalam amalan pengajaran mereka. Ini diterjemahkan menerusi kefahaman, kesediaan, dan komitmen yang ditunjukkan untuk menerapkan elemen berkenaan dalam amalan pengajaran mereka. Dalam aspek amalan pengajaran pula, para peserta didapati menerapkan pemikiran kritis melalui kaedah pengajaran berorientasikan penyoalan, perbincangan kumpulan, penerangan, tunjuk cara dan simulasi. Secara amnya, para peserta mempunyai kecenderungan yang positif serta berupaya menerapkan pemikiran kritis dalam amalan pengajaran mereka di IPG. Antara isu-isu yang timbul dalam membangunkan pemikiran kritis di IPG termasuklah aspek pembangunan kognitif, amalan pengajaran, pembangunan profesional, kekangan masa dan standard penilaian yang dipraktikkan. Pemikiran kritis sewajarnya diterap, dijelma dan dibudayakan secara terancang dalam amalan pengajaran setiap warga pendidik di IPG menerusi strategi dan kaedah pengajaran yang berorientasikan pembelajaran aktif seperti projek, simulasi, pengucapan lisan, peta konsep dan main peranan yang berupaya merangsang pemikiran kritis para pelajar secara lebih efektif.

Kata Kunci: Penerapan Pemikiran Kritis, Pensyarah IPG, Amalan Pengajaran.

Abstract

Critical thinking is an intellectual process that occurs actively and in a disciplined manner that requires conceptualizing, applying, analysing and synthesizing skills. The main goal of critical thinking that is accentuated at various levels of educational institutions is to produce students who are competent with future job challenges. Although its role is recognized across disciplines, its importance is still not taken seriously in teacher education. Currently, teacher education programs are widely criticized for being impractical and ineffective in shaping critical thinking generation. This qualitative research aims to explore how critical thinking is applied by lecturers in their teaching practices at one of the teacher education institutes in the northern region of Peninsular Malaysia. A total of six lecturers who teach Science and Mathematics were selected as participants for this study. The data supporting this research were obtained through interviews, observations of teaching activities as well as from relevant documents. Data were then analysed using Atlas-ti software Version 7.0. The findings indicated that majority of the participants showed a positive disposition towards applying critical thinking in their teaching practices. This is translated in their understanding, willingness, and commitment shown in applying relevant elements in their teaching practices. Meanwhile, in the aspect of teaching practices, the participants were found to apply critical thinking through questioning oriented teaching method, group discussions, explanations, demonstrations and simulations. In general, participants had a positive disposition and were able to apply critical thinking in their teaching practices in their teacher education institution. Among the issues that arise in developing critical thinking in their institution include aspects of cognitive development, teaching practices, professional development, time constraints and standard assessment practices. Critical thinking has to be inculcated, developed and practised systematically by IPG lecturers through active learning strategies such as projects, simulations, oral discourses, concept maps and role-plays which are capable of stimulating critical thinking among students effectively.

Keywords: Infusion of Critical Thinking, IPG Lecturers, Teaching Practice.

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Isi Kandungan

Senarai Jadual

Senarai Rajah

Senarai Lampiran

Senarai Singkatan

AACTE	Pertubuhan Kolej-Kolej Pendidikan Guru Amerika
AKEPT	Akademi Kepimpinan Pengajian Tinggi
BIG	Bina Insan Guru
BPG	Bahagian Pendidikan Guru
BPK	Bahagian Pembangunan Kurikulum
BPPDP	Bahagian Perancangan dan Penyelidikan Dasar Pendidikan
CTF	Critical Thinking Foundation
EDA	Executive Developement Associates
FPG	Falsafah Pendidikan Guru
FPK	Falsafah Pendidikan Kebangsaan
GGM	Gerak Gempur Minda
HOTS	Higher Order Thinking Skills
ICT	Information and Communication Technology
IPG	Institut Pendidikan Guru
IPGK	Institut Pendidikan Guru Kampus
IPGM	Institut Pendidikan Guru Malaysia
IPTA	Institusi Pendidikan Tinggi Awam
JNJK	Jemaah Nazir dan Jaminan Kualiti
JPN	Jabatan Pelajaran Negeri
KB	Kemahiran Berfikir
KBAT	Kemahiran Berfikir Aras Tinggi
KBKK	Kemahiran Berfikir Secara Kritis dan Kreatif
KBSM	Kurikulum Bersepadu Sekolah Menengah
KBSR	Kurikulum Baru Sekolah Rendah
KPLI	Kursus Perguruan Lepas Ijazah
KPM	Kementerian Pendidikan Malaysia
KPT	Kementerian Pengajian Tinggi
KSSR	Kurikulum Standard Sekolah Rendah
KSSM	Kurikulum Standard Sekolah Menengah
LOTS	Lower Order Thinking Skills

MKPG	Model Konseptual Pendidikan Guru
NAAEE	North American Association for Environmental Education
NAEP	National Assessment of Educational Progress
NBPTS	National Board for Professional Teaching Standards
NCATE	National Council for Accreditation of Teacher Education
NGO	Pertubuhan Bukan Kerajaan
OECD	Pertubuhan bagi Kerjasama Ekonomi dan Pembangunan
P21	Partnership for 21 Century Skills
PADI	Peningkatan dan Asuhan Daya Intelek
PBS	Pentaksiran Berasaskan Sekolah
PdP	Pengajaran dan Pembelajaran
PGSR	Pensiswazahan Guru Sekolah Rendah
PIPP	Pelan Induk Pembangunan Pendidikan
PISA	Programme for International Student Assessment
PISMP	Program Ijazah Sarjana Muda Perguruan
PPISMP	Pra Ijazah Sarjana Muda Perguruan
PPD	Pejabat Pelajaran Daerah
PPG	Program Pensiswazahan Guru
PPK	Pusat Perkembangan Kurikulum
PPPM	Pelan Pembangunan Pendidikan Malaysia
PSIKPM	Pelan Strategik Interim KPM
PSPN	Penilaian Semula Pendidikan Negara
RMK10	Rancangan Malaysia ke Sepuluh
SGM	Standard Guru Malaysia
SPPK	Sistem Pentaksiran Pendidikan Kebangsaan
TIMSS	Trends In International Maths and Science Study
TMK	Teknologi Maklumat dan Komunikasi
UNESCO	United Nations Educational, Scientific and Cultural Organization

BAB SATU

PENGENALAN

1.1 Pendahuluan

Abad ke-21 menyaksikan dimensi baru terhadap permintaan pasaran tenaga kerja di seluruh dunia. Fokus ekonomi global kini terarah kepada ekonomi berasaskan pengetahuan dan maklumat (Hoffman & Preus, 2016; Jarche, Stolovitch, & Clark, 2012; Kivunja, 2014; Schleicher, 2012). Bidang pekerjaan dan peluang ekonomi kini tidak lagi diagihkan berasaskan faktor geografi, kekayaan dan sumber alam sesebuah negara tetapi lebih berpaksikan kepada peningkatan daya saing, kualiti dan keupayaan tenaga kerja yang berpemikiran kritis (Darling & Harmond, 2010; Friedman, 2007; Kattayat, Josey, Asha, & Philip, 2016; Riggsbee, Malone & Straus, 2012; Trilling & Fadel, 2009; Webber-Youngman, 2017). Tinjauan oleh Wagner (2008) di Amerika terhadap ratusan syarikat, NGO dan peneraju kepimpinan pendidikan mendapati elemen pemikiran kritis dan penyelesaian masalah berada pada kedudukan teratas dalam aspek kemahiran yang paling diperlukan bagi seseorang pelajar untuk berjaya dalam cabaran ekonomi global. Menariknya, pemikiran kritis juga turut dikenal pasti sebagai elemen yang berada pada kedudukan tertinggi sebagai kompetensi yang paling diperlukan bagi memimpin organisasi perniagaan secara efektif pada masa hadapan (Brotherton, 2011; Conti, 2016; Kharbach, 2012).

Para penyelidik bersependapat bahawa pemikiran kritis merupakan elemen penting yang perlu dikuasai pelajar serta wajar diberi perhatian secara khusus di sekolah-sekolah (Browne & Freeman, 2000; Dumbrajs & Keinonen, 2009; Facione, 1990;

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Lampiran A

Dokumen Persetujuan Berpengetahuan

BAHAWASANYA, saya_____
(kemudian daripada ini dikenali sebagai peserta kajian), bersetuju bekerjasama dalam kajian yang dijalankan oleh Encik Fadzli Bin Dahalan (kemudian daripada ini dikenali sebagai pengkaji) untuk tujuan memenuhi keperluan penulisan sebuah tesis Ijazah Doktor Falsafah di Universiti Utara Malaysia bertajuk:

PENERAPAN PEMIKIRAN KRITIS DALAM KALANGAN GURU PRA-PERKHIDMATAN: KAJIAN KES DI INSTITUT PENDIDIKAN GURU (IPG)

Kajian ini bertujuan melihat fenomena semulajadi bagaimana elemen pemikiran kritis diterapkan dalam amalan pengajaran dan pembelajaran Pensyarah Matematik dan Sains di IPG merangkumi perancangan, permulaan, langkah perkembangan dan pengurusan bilik darjah.

Maka dengan ini:

i. Peserta kajian perlu membaca usulan kajian, diberi taklimat berkaitan matlamat kajian dan faham peranan peserta kajian dalam kajian.
ii. Peserta kajian maklum temu bual dan pemerhatian dijalankan di dalam kelas.
iii. Peserta kajian sedar dan mengakui maklumat yang diberi sepanjang temu bual adalah secara sukarela.
iv. Peserta kajian juga membenarkan pengkaji menjalankan pendokumentasian rekod.
v. Pengkaji berjanji untuk melindungi hak kerahsiaan dan identiti peserta kajian di mana nama sebenar peserta kajian tidak akan digunakan dalam penulisan tesis di atas.
vi. Peserta kajian diberi hak membaca transkripsi temu bual dan penulisan Bab Empat dan Bab Lima yang diperoleh daripada maklumat yang dikumpul.
vii. Peserta kajian mempunyai hak untuk menambah, mengubah dan membuang apa yang difikirkan tidak benar.
viii. Peserta kajian juga berhak menarik diri daripada kajian ini pada bila-bila masa.

Tandatangan peserta kajian

.....

*tertakluk kepada pindaan

Lampiran B

Protokol Temu Bual
Pensyarah

1) Demografi Pensyarah.

1. Kod: ……..
2. Umur: ……
3. Kelayakan Akademik: ……...
4. Opsyen/Pengkhususan/Bidang……
5. Pengalaman Mengajar: ……...
6. Pengalaman Mengajar Sebagai Pensyarah:……..
7. Kursus-kursus Yang Diajar Semester Ini:……....
8. Tugas-tugas Tambahan:…….
9. Cadangan Lain: ……....

2) Protokol Temu Bual Semi Struktur bagi Pensyarah

1. Kefahaman tentang pemikiran kritis
   i. Berdasarkan kefahaman anda, apakah yang dimaksudkan dengan pemikiran kritis?
   ii. Berdasarkan pemahaman anda, apakah ciri-ciri yang perlu ada seseorang individu yang berpemikiran kritis?
   iii. Pada pendapat anda, apakah perbezaan antara pemikiran kritis dengan pemikiran kreatif?

2. Sikap terhadap pengajaran pemikiran kritis
   i. Adakah elemen pemikiran kritis penting untuk bakal guru ?
   ii. Mengapakah elemen ini penting untuk bakal guru?
   iii. Mengapakah elemen pemikiran kritis wajar diberi keutamaan dalam setiap pengajaran dalam kelas?
   iv. Adakah anda mempunyai pengetahuan dan kemahiran yang mencukupi dalam mengembangkan elemen tersebut semasa pengajaran di kelas anda?
   v. Adakah anda mempunyai keyakinan untuk mengajarkannya dalam pengajaran anda?
   vi. Adakah anda melaksanakannya setiap kali pengajaran dalam kelas?

3. Kaedah/ Strategi Pengajaran
   i. Apakah strategi/kaedah pengajaran yang sering anda gunakan dalam kelas?
   ii. Mengapa anda cenderung menggunakan kaedah/strategi sebegini?
   iii. Bagaimana kaedah ini meningkatkan pemikiran kritis dalam kalangan pelajar anda?
   iv. Bagaimana respon para pelajar anda terhadap kaedah/strategi sebegini?
   v. Apakah bahan-bahan pengajaran yang sering anda gunakan semasa melaksanakan aktiviti pengajaran?

vi. Mengapakah anda cenderung memilih bahan-bahan pengajaran seumpama ini dalam pengajaran anda?
vii. Bagaimana bahan-bahan pengajaran yang anda gunakan berupaya menarik penglibatan pelajar terhadap pengajaran anda?
viii. Apakah cadangan-cadangan anda dalam meningkatkan penglibatan pelajar dalam proses pengajaran?

4. Isu-isu Pengajaran Pemikiran Kritis
   i. Pada pendapat anda, apakah isu-isu yang anda fikirkan timbul dalam menghalang anda dalam melaksanakan pengajaran berorientasikan pemikiran kritis?
   ii. Apakah kesan terhadap amalan pengajaran Pensyarah andainya isu-isu ini tidak tangani ?
   iii. Siapakah yang seharusnya bertanggungjawab memperbetulkan situasi sebegini?

5. Cadangan Memperkasakan Pemikiran Kritis di IPG
   i. Adakah anda berpuas hati terhadap langkah-langkah yang telah diambil oleh IPGM dan KPM dalam membangunkan pemikiran kritis di kampus IPG anda?
   ii. Apakah cadangan-cadangan anda kepada IPGM dan KPM sebagai sokongan kepada pensyarah dalam menerapkan elemen pemikiran kritis dengan lebih efektif di IPG?

6. Soalan Penutup
   Adakah anda mempunyai apa-apa maklumat dan pandangan lain yang ingin dikongsikan selain soalan yang telah saya kemukakan?

Lampiran C

Protokol Temu Bual
***'Thinking Aloud'*- Sebelum Pengajaran**

Nama : ..... **Kod: .....**

Bahagian A: Merancang Pengajaran

Jawab semua soalan berikut:

i) Apakah perkara pertama yang anda fikirkan setiap kali merancang pengajaran dan mengapa anda berfikir demikian?

ii) Apakah perkara-perkara penting yang lazimnya timbul dalam fikiran anda apabila merancang pengajaran?

iii) Apakah perkara-perkara yang lazimnya anda pertimbangkan dalam menerapkan kemahiran berfikir semasa merancang pengajaran?

iv) Bagaimanakah anda merancang untuk menerapkan elemen kemahiran berfikir semasa menyediakan Rancangan Pengajaran anda?

Bahagian B: Memilih Aktiviti

Jawab semua soalan berikut:

i) Apakah perkara utama yang anda fikirkan dalam menentukan aktiviti-aktiviti yang akan anda laksanakan dalam pengajaran?

ii) Apakah perkara-perkara yang seringkali anda pertimbangkan dalam menerapkan kemahiran berfikir semasa merancang aktiviti-aktiviti dalam pengajaran anda?

Lampiran D

Senarai Semak Pemerhatian Pengajaran Pensyarah

Bahagian/Item	Catatan
Bahagian A: Set Induksi i. Menggunakan elemen video dalam merangsang minat pelajar di awal kelas ii. Menggunakan elemen visual grafik dalam merangsang minat pelajar iii. Mengemukakan penyoalan yang relevan bagi merangsang minat pelajar iv. Melakukan *'gimick'* berupa lakonan atau simulasi	
Bahagian B: Strategi Pengajaran i. Berpusat guru ii. Berpusat pelajar iii. Berpusat bahan iv. Mempelbagaikan strategi dengan menggunakan kombinasi mana-mana dua atau lebih strategi yang dinyatakan di atas.	
Bahagian C: Sumber Pengajaran i. ICT-Power Point ii. Video-Klip dari youtube dan seumpamanya iii. Bahan maujud iv. Model v. Bahan edaran bertaip seperti latihan, nota dan lain-lain	
Bahagian D: Kaedah Pengajaran Yang Digunakan i. Konstruktivisme ii. Kooperatif iii. Eksperiment iv. Demontrasi atau Tunjuk Cara v. 'Online Learning' vi. Projek vii. Perbincangan viii. Sumbangsaran ix. Lakonan x. Simulasi xi. Lain-lain	
Bahagian E : Pengurusan Kelas/Persekitaran Pembelajaran i. Menggalak dan menekankan kecemerlangan hasil kerja pelajar ii. Mencabar pemikiran pelajar tanpa memberikan tekanan iii. Usaha berterusan bagi membina kepercayaan dengan pelajar iv. Mengorganisasi bahan, kuliah dan persembahan dengan tersusun v. Berfikiran terbuka dan fleksibel vi. Memastikan semua maklumat disampaikan dengan jelas vii. Membina situasi pembelajaran yang terbuka tanpa tekanan viii. Menggalakkan pelajar terlibat dalam perbincangan kumpulan dan kelas	

Bahagian F: Penyoalan Guru i. Soalan Aras Tinggi (KBAT) ii. Soalan Aras Rendah iii. Mengamalkan Teknik penyoalan yang betul iv. Mempelbagaikan aras penyoalan mengikut tahap pelajar	
Bahagian G: Menyokong Eksplorasi dan Eksperimental i. Menyediakan peluang untuk pelajar berfikir, belajar dan 'discover' ii. Menggalakkan pengajaran berinisiatif kendiri iii. Membantu pelajar mengkaji isu mengikut pandangan yang berbeza iv. Menggalakkan pelajar meneroka sendiri v. Menggalakkan pelajar menggunakan pelbagai pendekatan yang berbeza dalam menyelesaikan masalah menjana idea-idea. vi. Menggalakkan pencarian fakta dan pengumpulan maklumat. vii. Menggalakkan pelajar mengkaji isu-isu, nilai dan perasaan dari perspektif yang berbeza.	
Bahagian H: Kepelbagaian Idea dan Pemikiran Bercapah (Divergen) i. Menyokong idea pelajar ii. Memberi ganjaran bagi idea kritis dan kreatif iii. Menghormati pandangan dan idea pelajar yang berlawanan iv. Menyokong kepada penghasilan kerja pelajar yang asli, inisiatif kendiri dan bersifat eksperimental v. Menggalakkan pandangan dan menyuarakan idea-idea vi. Menggalakkan kontroversi akademik vii. Menggalakkan kebebasan dan pemikiran produktif viii. Mempertimbangkan pandangan pelajar tentang bahan pengajaran	
Bahagian I: Organisasi Pengajaran dan Isi Kandungan i. Menggalakkan proses analisis dan sintesis ii. Memberi masa yang ideal untuk pelajar berfikir iii. Menggunakan pelbagai bahan dan pendekatan pengajaran untuk sampaikan maklumat. iv. Menarik minat pelajar terhadap pengajaran v. Mengaitkan kandungan subjek dengan realiti dunia yang sebenar vi. Memberi tugasan yang bermakna dan berobjektif vii. Menggunakan soalan berorientasikan *'open ended'* dan penyiasatan	

Critical Thinking Instruction by Hamza dan Griffith (2006).

Lampiran E

Rumusan Amalan Merancang Dan Pengajaran Pensyarah

PESERTA KAJIAN	PdP DIGEMARI	(THINKING ALOUD) MERANCANG PdP	PdP DILAKSANAKAN
Nasri	i. Eksperiment ii. Projek iii. Perbincangan iv. Simulasi	• Merancang aktiviti yang berbentuk penyiasatan atau eksplorasi/ inkuiri/Penyelesaian masalah	i. Eksperiment ii. Kuliah iii. Perbincangan iv. Tunjuk cara v. Simulasi
Hayati	i. Projek	• Merancang aktiviti yang berbentuk penyiasatan atau eksplorasi/ inkuiri/Penyelesaian masalah • Memilih pendekatan samada PBL/ PBIS dengan bahan sumber yang sesuai untuk menjalankan aktiviti.	i. Tunjuk cara ii. Perbincangan iii. Pembentangan
Zeti	i. Projek	• Merancang aktiviti yang berbentuk penyiasatan atau eksplorasi/ inkuiri/Penyelesaian masalah • Penyoalan	i. Eksperiment ii. Perbincangan iii. Kuliah
Rahim	i. Projek	• Merancang aktiviti yang berbentuk penyiasatan atau eksplorasi/ inkuiri/Penyelesaian masalah • Melihat kepada hasil pembelajaran yang mudah dicapai (Proforma Kursus) • Memikirkan aktiviti yang mencabar daya fikir dan kebolehan mereka.	i. Kuliah ii. Perbincangan iii. Pembentangan
June	i. Perbincangan ii. Kooperatif	• Merancang aktiviti yang berbentuk penyiasatan atau eksplorasi/ inkuiri/Penyelesaian masalah • Penyoalan • Menyediakan latihan/ tutorial	i. Perbincangan ii. Kuliah

Lampiran F

Triangulasi Data Perancangan Dan Amalan Pengajaran Dan Pembelajaran Peserta Kajian

Peserta	Temu Bual 'Thinking Aloud' (Perancangan PdP)	Pemerhatian PdP (Video)	Dokumen Sokongan	Rumusan Amalan PdP Peserta Kajian
Nasri	-Strategi pembelajaran aktif -Aktiviti penyiasatan -Penuhi tuntutan kurikulum -Aktiviti yang sepadukan aspek kognitif & psikomotor -Gemar guna kaedah eksperimen, projek, perbincangan & simulasi	-Cenderung guna strategi berpusat guru. -Strategi berpusat pelajar kurang dipraktikkan -Guna kaedah PdP eksperimen, kuliah, demo & perbincangan kelas. -Guna sumber PdP seperti 'kosware', video, bahan maujud & lembaran kerja	-Strategi digunakan selaras dengan cadangan proforma kursus SCE3903 yang diajar -Tidak nyatakan dengan jelas elemen pemikiran kritis yang ingin dicapai dalam RPH -Lembaran kerja ada digunakan untuk menilai kefahaman pelajar.	-Strategi PdP aktif tidak dapat dijalankan sepenuhnya seperti dirancang. -PdP mematuhi tuntutan kurikulum kursus Sains IPG. -Pemikiran kritis diterapkan melalui penyoalan KBAT. -Komited pelbagaikan kaedah & sumber PdP yang dapat menjana daya fikir pelajar
Hayati	-Pilih strategi PdP aktif -Aktiviti PdP berasas penerokaan & penyelesaian masalah -Pastikan PdP selari dengan kurikulum -Gemar PdP konsep konstruktivisme -Gemar PdP berasaskan projek	-Lebih cenderung guna strategi PdP berpusat guru spt. demo -Pdp berpusat pelajar seperti perbincangan kumpulan -Terapkan pemikiran kritis melalui penyoalan KBAT -Guna soalan *'open ended'* -Guna sumber PdP yang minimum iaitu hanya MS Point, 'kosware; dan papan tulis.	-Strategi digunakan menepati tahap minimum dicadangkan dalam proforma kursus SCZ1064 yang diajar -Tiada huraian jelas tentang elemen pemikiran kritis yang ingin dicapai -Tiada lembaran kerja digunakan untuk menilai kefahaman pelajar.	-Strategi PdP cenderung berpusat guru tidak seperti yang dirancang. -PdP mematuhi tuntutan kurikulum kursus Sains IPG. -Pemikiran kritis diterapkan melalui aktiviti penyoalan dan sumbang saran pelajar. -Kurang pelbagaikan kaedah & sumber PdP yang dapat menjana daya fikir pelajar

Peserta	Temu Bual 'Thinking Aloud' (Perancangan PdP)	Pemerhatian PdP (Video)	Dokumen Sokongan	Rumusan Amalan PdP Peserta Kajian
Zeti	-Pilih strategi PdP aktif -Aktiviti PdP berasas penyiasatan, penerokaan & inkuiri -Gemar PdP berasaskan projek	-Lebih cenderung guna kombinasi strategi PdP berpusat guru & pelajar -Juga guna PdP berpusat pelajar seperti perbincangan kumpulan -Guna kaedah PdP simulasi video eksperimen, dan kuliah. -Terapkan pemikiran kritis melalui penyoalan KBAT -Guna sumber PdP yang minimum iaitu hanya MS Point, 'kosware; dan papan tulis & lembaran kerja	-Strategi digunakan menepati tahap minimum dicadangkan dalam proforma kursus SCE3083 yang diajar -Tiada huraian jelas tentang elemen pemikiran kritis yang ingin dicapai -Lembaran kerja digunakan untuk menilai kefahaman pelajar.	-Strategi PdP cenderung berpusat guru tidak seperti yang dirancang. -PdP merujuk tuntutan kurikulum kursus Sains IPG. -Pemikiran kritis diterapkan melalui aktiviti penyoalan dan perbincangan pelajar. -Pelbagaikan kaedah & sumber PdP yang dapat menjana daya fikir pelajar untuk menjelaskan konsep yang bersifat abstrak
Rahim	-Strategi pembelajaran aktif -Aktiviti PdP berbentuk inkuiri, eksplorasi & penyelesaian masalah -Mematuhi tuntutan kurikulum kursus -Aktiviti yang sepadukan aspek kognitif & psikomotor -Gemar PdP konsep konstruktivisme -Gemar guna kaedah projek.	-Cenderung guna strategi berpusat guru. -Strategi berpusat pelajar kurang dipraktikkan -Guna kaedah PdP kuliah & perbincangan kelas. -Guna sumber PdP seperti lembaran kerja -Terapkan pemikiran kritis melalui penyoalan KBAT -Guna sumber PdP yang minimum iaitu hanya MS Point, papan tulis & nota edaran	-Strategi digunakan menepati tahap minimum dicadangkan dalam proforma kursus GSA1072 yang diajar -Tidak nyatakan dengan jelas elemen pemikiran kritis yang ingin dicapai -Lembaran kerja ada digunakan untuk menilai kefahaman pelajar.	-Strategi PdP dilaksanakan lebih berpusat guru tidak seperti yang dirancang. -Pemikiran kritis banyak diterapkan melalui aktiviti penyoalan dan perbincangan pelajar dan penyelesaian masalah (soalan KBAT). -PdP selari dengan tuntutan kurikulum kursus Matematik dalam proforma IPG. -Kurang pelbagaikan kaedah & sumber PdP yang bersifat interaktif dalam menjana daya fikir pelajar.

Peserta	Temu Bual 'Thinking Aloud' (Perancangan PdP)	Pemerhatian PdP (Video)	Dokumen Sokongan	Rumusan Amalan PdP Peserta Kajian
June	-Pilih strategi PdP aktif -Aktiviti PdP berasas eksplorasi & penyelesaian masalah -Gemar PdP konsep kooperatif	-Lebih cenderung guna kombinasi strategi PdP berpusat guru & pelajar -Juga guna PdP berpusat pelajar seperti perbincangan kumpulan -Terapkan pemikiran kritis melalui penyoalan KBAT -Guna sumber PdP yang minimum iaitu hanya TMK, MS Point, 'kosware; dan papan tulis & lembaran kerja	-Strategi digunakan menepati tahap minimum dicadangkan dalam proforma kursus GSA1072 yang diajar -Tiada huraian jelas tentang elemen pemikiran kritis yang ingin dicapai -Lembaran kerja digunakan untuk menilai kefahaman pelajar.	-Strategi PdP aktif tidak dapat dijalankan sepenuhnya seperti dirancang. -PdP lebih berpusatkan guru -Pemikiran kritis banyak diterapkan melalui aktiviti penyoalan guru dan penyelesaian masalah (soalan). -PdP selaras dengan tuntutan proforma kursus Matematik ditetapkan IPG. -Kurang pelbagaikan kaedah & sumber PdP yang bersifat interaktif dalam menjana daya fikir pelajar.

Lampiran G

Hari : Rabu

Masa : 10.30 a.m.-11.30 a.m.

Tarikh : 24/6/2015

Kelas : 2PPISMPMAT

Bilangan Pelajar : 20 orang pelajar

Topik : Statistik (Matematik)

Subtopik : Mod dan Min

Objektif Pembelajaran:

i) Memahami dan menggunakan konsep mod dan min bagi data yang terkumpul.

Hasil Pembelajaran:

Di akhir sesi pengajaran pelajar dapat:

i) Menentukan kelas mod daripada jadual kekerapan terkumpul.
ii) Mengira nilai titk tengah sesuatu kelas.
iii) Mengira nilai min daripada jadual kekerapan data terkumpul.
iv) Membincangkan kesan saiz selang kelas terhadap ketepatan min bagi set data terkumpul.

Pengetahuan Sedia : Mengenali jenis data, mengetahui asas dalam melukis histogram, & memahami cara mendapatkan mod, penengah (median) dan min.

Kaedah Mengajar : Pembelajaran Berasaskan Masalah (PBM)- Konstruktivisme

Strategi Mengajar : Bebas untuk bermain dengan bahan yang diberi, menjana sesuatu idea dan formula berdasarkan bahan dan arahan.

Alat Bantuan Guru : 5 set data markah ujian daripada helaian kertas yang diberi, Laptop (komputer riba), LCD, papan tulis, kertas graf.

Kemahiran Berfikir : Menjana idea, menganalisis, menilai dan membuat kesimpulan.

Nilai-nilai Murni : Kerjasama, keyakinan, penumpuan, berani mencuba, mengikut peraturan, dan komunikasi.

Langkah / Waktu	**Kandungan**	**Aktiviti**	**Strategi / Kaedah / BBM / KBKK / Nilai Murni**
Langkah 1 : Set Induksi (5 minit)	Konsep mod dan min. Memahami kepentingan kekerapan dan purata pada sebuah data.	Kelas dimulakan dengan guru memberikan rangsangan awal dan penerangan serta gambaran mengenai subtopik yang akan dipelajari pada hari tersebut. Guru berinteraksi dan membuka peluang kepada pelajar untuk mengemukakan pandangan dan mengaitkan kepentingan subtopik ini dan aplikasi konsep ini dengan realiti kehidupan seharian mereka.	**Strategi :** Penerangan dan penyoalan **Kaedah :** Perbincangan bersama guru & Sumbangsaran **Bahan Mengajar :** Papan putih, pen marker, Visual **KBKK :** Menjana idea **Nilai Murni :** Fokus
Langkah 2 : (15 minit)	Definisi mod dan min -Mod adalah nilai yang paling kerap muncul di dalam set data. -Mod digunakan untuk menentukan kategori yang kerap terjadi. -Min adalah nilai purata bagi satu set data. -Min merupakan ukuran yang paling luas penggunaanya dalam statistik.	- Pelajar diarah membentuk kumpulan yang terdiri daripada 4 orang ahli. -Guru mengagihkan bahan rangsangan kepada setiap kumpulan. -Pelajar dikehendaki berbincang tentang bagaimana memberi makna kepada data. -Setiap kumpulan dikehendaki untuk mencari kekerapan dan membahagikan bahan secara sama rata antara ahli kumpulan. -Membuat pantauan di setiap kumpulan pelajar agar mereka tidak beralih tumpuan.	**Strategi :** Pembelajaran berkumpulan. **Kaedah :** Berbincang antara ahli kumpulan secara kreatif dan kritis. **Bahan Mengajar :** Set data pencapaian ujian bulanan pelajar **KBKK:** Berbincang bersama dan berfikir secara terbuka tidak hanya terikat pada formula. **Nilai Murni :** Menerima pendapat orang lain, bekerjasama

Langkah 3 : (20 minit)	-Kesan saiz kelas ke atas min. -Semakin kecil saiz kelas, semakin tepat nilai purata. Nyatakan nilai mod dan kira nilai min bagi setiap data terkumpul.	-Guru menerangkan tujuan membina data terkumpul yang lebih kecil. -Guru meminta pelajar untuk memberi makna kepada data terkumpul melalui graf dan carta pai. -Guru menunjukkan bagaimana membina graf garis, graf bar dan piktograf menggunakan perisian MS Excell. -Pelajar diminta berbincang dalam kumpulan bagimana memindahkan data terkumpul dalam bentuk grafik. -Pelajar diminta mentafsirkan dapatan dengan bantuan guru. -Guru membimbing pelajar membuat anggaran nilai berdasarkan graf	**Strategi :** Menukar bahan untuk memberi ransangan yang berbeza **Kaedah :** Perbincangan, kaedah seperti di langkah 2 **Bahan Mengajar :** Komputer riba, MS Excell **KBKK:** Berbincang bersama dan berfikir secara terbuka tidak hanya terikat pada formula **Nilai Murni :** Bekerjasama dan konsentrasi
Langkah 4 : Penilaian (15 minit)	Membuat anggaran dan ramalan berdasarkan graf	Menyediakan set soalan pengayaan untuk tingkatkan lagi kefahaman pelajar dalam subtopik ini. Memberi pendedahan akan kegunaan graf sebagai dalam menentukan nilai dan anggaran di samping penggunaan formula kepada pelajar untuk subtopik ini. -Pelajar membentang dapatan perbincangan dalam kumpulan.	**Strategi:** -Explorasi **Kaedah :** Perbincangan **Bahan Mengajar :** Persembahan slaid **KBKK :** Menganalisis dan mentafsir serta menyelesaikan soalan yang diberi **Nilai Murni :** Keyakinan

Langkah 5 : Penutup (5 minit)	Ringkasan pembelajaran : i. Konsep mod dan min ii. Definisi mod dan min iii. Kesan saiz kelas ke atas min.	-Guru akan memberi peluang kepada pelajar untuk menerangkan kembali apa yang mereka faham akan subtopik ini di hadapan kelas. -Menggalakkan para pelajar memberi contoh perkaitan subtopik ini dengan kehidupan seharian. - Guru menyuruh pelajar membina rumusan isi pelajaran dengan menggunakan peta minda untuk menilai kefahaman dan memudahkan mereka ulangkaji pelajaran. -Latihan tambahan berupa pengayaan diberikan kepada pelajar untuk mempertingkatkan lagi kefahaman dan kemahiran mereka.	**Strategi :** Menggunakan peta konsep **Kaedah :** Perbincangan **KBKK :** Membuat refleksi dan kesimpulan. **Bahan Mengajar :** Peta konsep daripada persembahan slaid. **Nilai Murni :** Bekerjasama, mampu untuk mencuba dan berkeyakinan, menghargai ilmu ini dan akan menggunakan dalam kehidupan seharian.

Refleksi:

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Lampiran H

Hari : Khamis
Masa : 9.00 a.m.-11.00 a.m.
Tarikh : 16/4/2015
Kelas : 7PISMPSC
Bilangan Pelajar : 20 orang pelajar
Topik : Pengoksidaan Dan Penurunan (Sains)
Subtopik : Pengaratan Besi

Objektif Pembelajaran:

Memahami pengaratan besi merupakan tindak balas Redoks.

Hasil Pembelajaran:

Di akhir sesi pengajaran pelajar dapat:

i) Pelajar dapat menyatakan syarat pengaratan besi
ii) Pelajar dapat menerangkan proses pengaratan dari segi pengoksidaan dan penurunan

Pengetahuan Sedia :
i) Konsep tindak balas redoks,
ii) Menghitung nombor pengoksidaan bagi unsur dalam sebatian dan
iii) Menulis persamaan setengah pengoksidaan dan penurunan, dan persamaan ion

Pendekatan : Pendekatan Inkuiri Penemuan

Kaedah Mengajar: Kaedah pembelajaran kontekstual, koperatif dan kolaboratif.

Strategi Mengajar: Berpusatkan bahan, pelajar dan guru. Melakukan uji kaji. Bebas untuk bermain dengan bahan yang diberi dan menjana idea sendiri berdasarkan arahan diberikan.

Alat Bantuan Guru :
i) Alatan dan Radas : Satu rak tabung uji, tiga tabung uji beserta gabus penutup, tiga batang paku besi, kalsium klorida kontang, air dan minyak

ii) Sumber P&P : Laptop (komputer riba), LCD, klip video, dan papan tulis.

Kemahiran Berfikir : Menjana idea, menganalisis, menilai dan membuat kesimpulan.

Nilai-nilai Murni : Kerjasama, keyakinan, ketelitian, berani mencuba, memahami dan mematuhi peraturan, dan komunikasi.

Langkah / Waktu	Kandungan	Aktiviti	Strategi / Kaedah / BBM / KBKK / Nilai Murni
Langkah 1: Set Induksi (5 minit)	Mengumpul dan mentafsirkan data tentang pengoksidaan, penurunan. tindak balas redoks.	Kelas dimulakan dengan guru memberikan rangsangan awal dan penerangan serta gambaran mengenai subtopik yang akan dipelajari pada hari tersebut. i). Guru menayangkan slaid yang memaparkan gambar barangan besi yang berkarat seperti pagar, rantai, kereta dan sebagainya. ii). Guru bertanya tentang elemen-elemen yang menyebabkan besi-besi tersebut berkarat	**Strategi :** Penerangan dan penyoalan **Kaedah :** Perbincangan bersama guru & Sumbangsaran **BBM:** Papan putih, pen marker, Visual **KBKK :** Menjana idea **Nilai Murni :** Fokus
Langkah 2 : (15 minit)	Tindak balas Redoks	- Pelajar diarah membentuk 4 kumpulan yang terdiri daripada 5 orang ahli. -Guru mengarahkan Ketua Kumpulan tampil mengambil set radas dan bahan uji kaji. -Guru mengedar lembaran prosedur aktiviti dan menerangkan setiap langkah sebelum pelajar melaksanakan penyiasatan. -Pelajar dikehendaki berbincang tentang bagaimana melaksanakan uji kaji dan agihan kerja kumpulan. -Memantau dan membimbing setiap kumpulan pelajar.	**Strategi :** Pembelajaran berkumpulan berpusatkan pelajar dan bahan. **Kaedah :** Berbincang antara ahli kumpulan, Eksperimen **BBM:** Satu rak tabung uji, tiga tabung uji beserta gabus penutup, tiga batang paku besi, kalsium klorida kontang, air dan minyak **KBKK:** Membanding beza, menilai, menyusun, mengkonsepsi, inferens, hipotesis, meramal & membuat kesimpulan **Nilai Murni :** Toleransi, bersifat terbuka bekerjasama, berani mencuba, tidak berputus asa, mengikut arahan dan peraturan dan jujur.

Langkah 3 (20 minit)	-Modul Amali Sains	-Guru bertanya dapatan pelajar setiap kumpulan. -Guru menerangkan syarat-syarat pengaratan besi. -Guru menerangkan inferens terhadap penyiasatan yang dibuat. -Guru membimbing pelajar membuat inferens, ramalan & hipotesis guna Penyoalan Socratic.	**Strategi :** Penyoalan Socratic **Kaedah :** Perbincangan & penyoalan KBAT. **BBM:** Modul Amali Sains **KBKK:** Berbincang bersama dan berfikir secara terbuka tidak hanya terikat pada formula **Nilai Murni :** Bekerjasama dan konsentrasi
Langkah 4 Penilaian (15 minit)	-Menerangkan proses pengaratan melibatkan pengoksidaan dan penurunan dalam tindak balas Redoks	-Guru memberi penerangan sambil memaparkan slaid yang menunjukkan proses pengoksidaan dan penurunan sehingga berlakunya pengaratan. -Guru turut mengemukakan soalan bagi mendapatkan respon terhadap kefahaman pelajar.	**Strategi:** Berpusatkan guru **Kaedah :** Penerangan & penyoalan **BBM:** Komputer riba, Persembahan slaid MS PT **KBKK :** Menganalisis dan mentafsir serta menyelesaikan soalan yang diberi **Nilai Murni :** Keyakinan

Langkah 5 Penutup (5 minit)	Ringkasan pembelajaran : i. Konsep pengoksidaan & penurunan ii. Proses pengaratan iii. Tindak balas Redoks	-Guru memberi peluang kepada pelajar untuk menerangkan kembali konsep dan proses pengaratan. -Guru memberi peneguhan terhadap fakta-fakta berkaitan pengoksidaan dan penurunan serta kaitannta dengan proses pengaratan. -Membimbing pelajar mengemukakan contoh-contoh yang relevan berkaitan subtopik ini dengan kehidupan seharian. -Guru menyenaraikan 7 kata kunci berkaitan proses pengoksidaan, penurunan, pengaratan dan tindak balas Redoks. - Guru menyuruh pelajar membina rumusan isi pelajaran dengan menggunakan peta minda untuk menilai kefahaman dan memudahkan mereka ulangkaji pelajaran. -Latihan tambahan berupa set Lembaran Kerja diberikan kepada setiap pelajar untuk menilai kefahaman pelajar secara eksplisit.	**Strategi :** Menggunakan peta konsep **Kaedah :** Perbincangan **KBKK :** Membuat refleksi dan kesimpulan. **BBM:** Peta konsep daripada persembahan slaid. **Nilai Murni :** Bekerjasama, mampu untuk mencuba dan berkeyakinan, menghargai ilmu ini dan akan menggunakan dalam kehidupan seharian.

Refleksi:

Lampiran I

Analisis Amalan PdP Pensyarah IPG